

Appl. No. 09/719,709
Arndt, Dated January 8, 2004
Reply to Office action of October 8, 2003
Attorney Docket No. P09410-US1
EUS/J/P/04-3005

REMARKS/ARGUMENTS

Amendments

The Applicants have amended Claims 1-2, 4-11 and 13-18; Claims 3 and 12 have been cancelled. Accordingly, Claims 1-2, 4-11 and 13-18 are pending in the application. Favorable reconsideration of the application is respectfully requested in view of the foregoing amendments and the following remarks.

Examiner Objections

Claims 1-2 and 4-9 were objected to because of the informality associated with the word "definition." The Applicants have amended independent Claims 1-2 and 4-9 to correct the informality.

Claim Rejections – 35 U.S.C. § 112

Claims 6 and 16 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Applicants have amended the claims to correct the antecedent basis.

Claim Rejections – 35 U.S.C. § 103 (a)

Claims 1, 2, 6/1, 6/2, 10, 11, 15/10 and 15/11 under 35 U.S.C. § 103(a) stand rejected as being unpatentable over Strom *et al.* ("Medical Image Compression with Lossless Regions of Interest") (hereinafter, Strom). The Applicants have amended Claims 6 and 15 to remove the multiple dependencies rendering the rejection of Claims 6/2 and 15/11 moot. The Applicants respectfully traverse the rejection of the remaining claims.

The present invention provides a method and arrangement for sending an image between a transmitter and receiver over a channel with a limited bandwidth. The image has objects that are important and a background that is less important. The objects are considered regions of interest. The image is transformed into transform coefficients and the coefficients are assigned to different segments of the image according to a mask

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that corresponds to the regions of interest. The segments are coded independently of each other and each may have a different degree of accuracy. The coding results in "sub"-bit streams that are linked with the image header to form a bit stream which is then sent to the receiver. The receiver decodes the header and reconstructs the mask in the transform domain. The image is then recreated with the aid of the mask to the desired degrees of accuracy in the respective regions. The Applicants respectfully direct the Examiner's attention to amended independent Claim 1.

1. (Currently Amended) A method of transmitting and receiving an image, comprising,
when transmitting the image:
performing a forward transformation on the image to be transmitted;
defining the required regions of interest in the image;
creating a mask describing transform coefficients for reconstructing each region of interest;
utilizing the mask to classify the coefficients in the transform domain into segments;
coding each segment independently;
concatenating the bit stream of each segment together with necessary stream and header information; and
sending the concatenated bit stream to the receiver; and
when receiving the image:
receiving the concatenated bit stream and decoding the header information;
locating and decoding the segment information associated with the regions of interest in the concatenated bit stream;
creating a mask describing which coefficients are needed for reconstructing the segments of each region of interest;
decoding the needed segment data from the concatenated bit stream; and
reconstructing the needed segments for displaying the reconstructed segments. (emphasis added)

The Applicant respectfully traverses this rejection and submits that Strom does not disclose (directly or inherently) the above emphasized limitations recited in amended Claim 1.

The Strom reference appears to compare algorithms for lossless region of interest (ROI) compression. In the reference, previous methods for region-based coding

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of medical images are discussed. Among the methods discussed, Strom discusses coding image regions where each region may have a predetermined accuracy level. However, Strom does not discuss, teach or suggest creating a mask to describe transform coefficients, nor does Strom utilize the mask to classify coefficients into segments for coding. When the coded segments are received, a mask is created describing the coefficients needed for reconstructing the segments of the image. The Strom reference does not teach or suggest the use of a mask in the discussions of the new algorithms. Therefore, the Applicants respectfully submit that Claim 1 is patentable over the Strom reference. Claims 2 and 6 depend from Claim 1 and contain the same novel limitations. This being the case, Claims 2 and 6 are patentable over Strom.

As between Claim 1 and the Strom reference, the Applicant submits that independent Claim 10 contains limitations analogous to those found in Claim 1. For the above given reasons the Applicant respectfully submits that Claim 10 is also patentable over the Strom reference. Claims 11 and 15 depend from Claim 10 and contain the same novel limitations. This being the case, Claims 11 and 15 are patentable over Strom.

Claims 5/1, 5/2, 14/10, and 14/11 are rejected under 35 U.S.C § 103(a) as being unpatentable over Strom *et al.* ("Medical Image Compression with Lossless Regions of Interest") as applied to claims 1 and 10, and further in view of Gonzalez *et al.* ("Digital Image Processing") (hereinafter Gonzalez). The Applicants have amended the multiple dependency limitation in Claims 5 and 14. The Applicants respectfully assert that Claims 5 and 14, now depending from Claims 1 and 10 contain the same novel limitations as the respective independent claims.

Gonzalez is cited for teaching the use of topology descriptions as regional descriptors. However, Gonzalez does not supply the missing element of creating and using a mask to classify transform coefficients into segments within an image. Therefore Claims 5 and 14 are patentable over the Strom and Gonzalez references.

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Claims 7/1, 7/2, 8/1, 8/2, 9/1, 9/2, 16/10, 16/11, 17/10, 17/11, 18/10 and 18/11 stand rejected under 35 U.S.C § 103(a) as being unpatentable over Strom *et al.* ("Medical Image Compression with Lossless Regions of Interest") as applied to claims 1 and 10, and further in view of Impagliazzo *et al.* (US 5,757,974) (hereinafter Impagliazzo). The Applicants have amended the multiple dependency limitation in Claims 7-9 and 16-18. The Applicants respectfully submit that Claims 7-9 and 16-18 depend from independent Claims 1 and 10 and contain the same novel limitations.

Impagliazzo is cited for teaching that it is known to generate a segment description. Impagliazzo does not teach the use of a created mask for classifying transform coefficients into a segment. Therefore, Claims 7-9 and 16-18 are patentable over Strom and Impagliazzo.

Claims 4/1, 4/2, 13/10, and 13/11 were rejected under 35 U.S.C § 103(a) as being unpatentable over Strom *et al.* ("Medical Image Compression with Lossless Regions of Interest") in view of Katata *et al.* (US 5,978,515) (hereinafter, Katata). The Applicants have amended the multiple dependency limitation in Claims 4 and 13. The Applicants respectfully traverse the rejection of Claims 4 and 13.

Katata is cited here for the limitation of decoding only predetermined parts of the compressed bit stream. However, Katata does not supply the missing limitation of creating and utilizing a mask for classifying transform coefficients into segments of the image. Claims 4 and 13 now depend from Claims 1 and 10 respectively and contain the same mask limitation as Claims 1 and 10. Therefore, Claims 4 and 13 are patentable over Strom and Katata individually and a combination of both references.

Claims 3 and 12 are rejected under 35 U.S.C § 103(a) as being unpatentable over Strom *et al.* ("Medical Image Compression with Lossless Regions of Interest") in view of Wine *et al.* (US 6,477,201). Claims 3 and 12 have been canceled rendering the rejection of these claims moot.

Wine is cited for teaching that it is known for using a mask that indicates a desired encoding quality. However, Wine does not teach creating a mask for classifying

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transform coefficients into segments within an image and then using that mask to reconstruct the segment at a receiver.

Claims 4/3 and 13/12 stand rejected under 35 U.S.C § 103(a) as being unpatentable over Strom *et al.* ("Medical Image Compression with Lossless Regions of Interest") in view of Wine *et al.* (US 6,477,201) and further in view of Katata *et al.* (US 5,978,515). Claims 3 and 12 are canceled. Claims 4 and 13 now depend from Claims 1 and 10 respectively and contain the same novel limitations.

Regarding Claims 4/3 and 13/12, the Applicants respectfully submit that the arguments presented above for Claim 4/1 are applicable to Claims 4/3 and 13/12. Therefore, Claims 4 and 13 are patentable over Strom, Wine and Katata, individually and a combination of both references.

Claims 5/3 and 14/12 are rejected under 35 U.S.C § 103(a) as being unpatentable over Strom *et al.* ("Medical Image Compression with Lossless Regions of Interest") in view of Wine *et al.* (US 6,477,201) and further in view of Gonzalez *et al.* ("Digital Image Processing"). Claims 3 and 12 are canceled. Claims 5 and 14 now depend from Claims 1 and 10 respectively and contain the same novel limitations.

Regarding claims 5/3 and 14/12 the Applicants respectfully submit that the arguments presented above for Claim 5/1 are applicable to Claims 5/3 and 14/12. Therefore, Claims 5 and 14 are patentable over Strom, Wine and Gonzalez individually in combination.

Claims 6/3 and 15/12 are rejected under 35 U.S.C § 103(a) as being unpatentable over Strom *et al.* ("Medical Image Compression with Lossless Regions of Interest") in view of Wine *et al.* (US 6,477,201) as applied to claims 3 and 2 above. Claims 3 and 12 are canceled and Claim 6 and 15 now depend from Claims 1 and 10 respectively and contain the same novel limitations.

Regarding claims 6/3 and 15/12 the Applicants respectfully submit that the arguments presented above for Claim 6/1 are applicable to Claims 6/3 and 15/12.

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Therefore, Claims 6 and 15 are patentable over Strom and Wine individually and in a combination of both references.

Claims 7/3, 8/3, 9/3, 16/12, 17/12 and 18/12 are rejected under 35 U.S.C § 103(a) as being unpatentable over Strom *et al.* ("Medical Image Compression with Lossless Regions of Interest") in view of Wine *et al.* (US 6,477,201) as applied to claims 3 and 12 above and further in view of Impagliazzo *et al.* (US 5,757,974). Claims 3 and 12 are canceled. Claims 7, 8, 9, 16, 17 and 18 now depend directly or indirectly from Claims 1 and 10 and contain the same novel limitations.

Regarding Claims 7/3, 8/3, 9/3, 16/12, 17/12 and 18/12 the Applicants respectfully submit that the arguments presented above for Claim Claims 7/1, 8/1, 9/1, 16/10, 17/10 and 18/10 are applicable to Claims 7/3, 8/3, 9/3, 16/12, 17/12 and 18/12. Therefore, Claims 7, 8, 9, 16, 17 and 18 are patentable over Strom, Wine and Impagliazzo individual, and in combination.

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CONCLUSION

In view of the foregoing remarks, the Applicants believe all of the claims currently pending in the Application to be in a condition for allowance. The Applicant, therefore, respectfully requests that the Examiner withdraw all rejections and issue a Notice of Allowance for Claims 1-2, 4-11, and 13-18.

The Applicants request a telephonic interview if the Examiner has any questions or requires any additional information that would further or expedite the prosecution of the Application.

Respectfully submitted,



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